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government endowments for technical education (at present about \$3,500,000 a year), especially for research, are desirable, the author of the paper, as well as those who discussed it, agreed that the greatest need is the improvement of the system of secondary education.

J. L. H.

RELATIONS OF THE LEMURES, PRIMATES AND UNGULATES.

PROF. A. A. W. HUBRECHT has contributed to the second volume of the Gegenbaur *Festschrift* an important memoir upon the placentation of *Tarsius*, in which he reaches the conclusion that this animal should be entirely removed from the Lemuroidea, where it has always stood hitherto, and placed with the true Primates or Anthroproidea. The following is a recapitulation of his conclusions:

1. Numerous peculiarities in the formation of the blastocyst of *Tarsius spectrum* show it to be more closely related to monkeys and man than to any other mammalian genus.

2. The ventral stalk in the blastocyst of man and monkeys, with the ontogenesis of which we were up to now most imperfectly acquainted, is explained both onto- and phylogenetically by the facts which we observe in *Tarsius*.

3. By its dentition *Tarsius* takes an intermediate place between the monkeys and mesozoic Insectivora; the upper molars are purely tritubercular, the lower ones tuberculo-sectorial with well-developed pr^d , me^d , pa^d , hy^d and en^d .

4. Among fossil Mammals the genus *Anaptomorphus* Cope takes up an intermediate position between *Tarsius* and man. Cope was thereby actuated to choose the specific name *homunculus*.

5. The Mammalian order of the Primates should henceforth be looked upon as fully distinct from that of the Lemures; the former reaches back into the Mesozoic Per-

iod and has been independent of all the other Mammalian orders through the whole Tertiaries.

6. To the order of Primates belong (1) man, (2) the monkeys, (3) the two genera *Tarsius* (recent) and *Anaptomorphus* (fossil, lower Eocene), which have been hitherto classified with the Lemures.

7. Undoubtedly a greater number of fossil genera will have to be classed with the Primates; great prudence should, however, prevail before we assign that place to any of them. It is better to wait for more complete skeletons before we attempt to establish any sharp distinction between fossil Primates and Lemures.

8. The Lemures (inclusive of Cope's extinct Mesodonta) have in their turn close relationships to numerous Primitive Tertiary mammalian types, such as the unspecialized Ungulata, Condylarthra, Creodonts, etc. The placentation and the blastocyst are in the Lemures fundamentally different from those of *Tarsius*, but are at the same time undoubtedly phylogenetically comparable to those of the latter mammals.

9. The placentation and the formation of the blastocyst in the Primates cannot be derived from what we find in the Lemures. They can, however, without difficulty be brought into genetic relationship with processes such as we notice in central Insectivorous genera, such as *Erinaceus*.

CURRENT NOTES ON PHYSIOGRAPHY.

GRAPE BELT OF WESTERN NEW YORK.

GRAPE raising is an important industry along the Erie shore of western New York, and it appears that, in addition to the favoring climatic influences of the lake, the gravelly bars of the ancient expanded lake offer the best soils for vineyards, as described by Tarr (Bull. 109, Cornell Univ. Agr. Exp. Station). These ancient lake shores lie on the Erie plain, an inner lowland denuded on the weak lower Devonian

strata, between the rising upper Devonian inface that ascends to the Alleghany plateau, on the south, and the falling Niagara inface that descends, on the north, to the Ontario plain, the latter being another inner lowland of the very ancient coastal plain of which the Laurentian highlands of Canada are the oldland.* A large part of these inner lowlands is under the water of the lakes, but where emerged they support a thriving agricultural population; fruit being extensively cultivated on the Ontario plain north of the Niagara infacing escarpment (locally known as 'the mountain'; a good illustration of the geographical poverty of our language), as well as on the Erie plain. Although the ancient lake shores hereabouts are characterized by gravel bars, the present Erie shore is mostly a cliff, cut in shales. Besides the reasons suggested by Tarr for this contrast, the greater time of action at the present level may be considered. The ancient shore lines of Lake Erie in the fruit belt did not advance beyond the youthful stage of building off-shore bars on a shallow bottom. The present shore lines have advanced to the mature stage of low cliffs cut into the gently sloping mainland. Whether the present shore lines went through the preparatory phase of building off-shore bars cannot be said without further study, but there does not appear to be any reason why they should not have witnessed all the normal stages of shore-line development up to their existing maturity.

THE GORGE OF THE AAR.

A. R. WALLACE, an earnest advocate of the glacial origin of lake basins, illustrates the competence of ice streams to erode rock basins by the relation of the gorge of the Aar, cut through a rocky barrier that traverses its valley above Lake Brienz, to the

broad valley-basin further upstream (*Fortnightly Review*, Aug., '96). The basin is covered with a plain of alluvium, estimated to be 200 feet deep. The rocky barrier averages 450 feet higher than the alluvial plain, and is thought to have lost 350 feet of height by glacial erosion. The rock floor of the basin is thus shown to be 1000 feet deeper than the preglacial height of the barrier, and this depth is taken as the measure of glacial erosion above the barrier.

The extension of valid argument of this kind to the conclusion that all lakes in glacial regions are of glacial origin, seems illogical; and the derogatory references to the explanation of lakes by subsidence or deformation seems hardly candid in face of the facts reported by many Swiss geologists. Indeed, the generality of glacial erosion in certain regions may be so forcibly met by the generality of glacial deposition in others, that lakes must be individually studied if their actual origin is to be explained. The citation of the essays by Lincoln and Tarr concerning the Finger Lakes of New York, and the silence concerning such essays as Aeppli's on Lake Zurich, give Wallace's essay an air of special pleading.

ALAI AND PAMIR.

F. DE ROCCA summarizes recent explorations of the elevated portion of central Asia, in which he has himself taken part (*Rev. de Géogr.*, xix., 1896, Jan., April). The Pamir is described as an immense uplift, trenched by profound valleys, and surrounded by colossal mountain ranges; thus differing from the definition given by Curzon (*SCIENCE*, Aug. 21, 1896). The mountains are characterized as colossal, grandiose, imposing; but relation of form to structure and denudation is hardly touched. The long valleys descend gradually eastward to the interior basin, but abruptly westward to the open lowlands. The main divides are sometimes on the valley floors.

* Oldland, inner lowland and inface are convenient terms in the description of denuded coastal plains.

The name, Alaï, is applied to an extensive intermontane plain, and to the range enclosing it on the north. This plain and the similar elevated intermontane plains of the Pamir further south are spoken of as 'plateaus,' without explicit indication of structure, whether rock-floored or built of waste from the adjoining mountains, but the latter origin is implied. Lakes are said to be numerous, but they are briefly mentioned without sufficient indication of their associated features.

In a word, this series of articles forms a good example of the style of geographic descriptions in vogue to-day. It furnishes much general information as to the conditions of a region that has in recent years attained more political importance than its intrinsic value would give it; but the physiographic basis of the information is most elementary where it is not vague or wanting.

NOTES.

THOSE who attend the Geological Congress at St. Petersburg next summer will find an instructive summary of the movements of the earth's crust in Russia by Karpinsky (*Ann. de Géogr.*, v., 1896, 179-193). It is pointed out that the most tranquil area lies on the northwest, and that troughs of depression elsewhere show a notable sympathy in direction either with the Ural or the Caucasus mountains.

THE fertile subject of the physical subdivisions of the Alps is discussed anew by Haug (*Ibid.*, 167-178). He emphasizes the importance of synclinal basins, such as that of the Dolomites, as well as of anticlinal central *massifs*. An instructive map accompanies the essay.

FAIRCHILD describes several kame areas of pronounced form in western New York (*Chicago Journ. Geol.*, iv., 1896, 129-159) and a number of temporary glacial lakes and their southward overflow channels in

the region of the Genesee valley (*Bull. Geol. Soc. Amer.*, vii., 1896, 423-452).

W. M. DAVIS.

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CURRENT NOTES ON ANTHROPOLOGY.

RUINS IN SOUTH AFRICA.

AN instructive article by Mr. R. M. W. Swan, in the *Journal of the Anthropological Institute* for August, gives further information about the ruined cities in the Zambesi country. They exist in great numbers throughout that territory, and are usually of small dimensions. The principal edifice is of rough stone, and is carefully oriented to the quarters of the heavens. For this reason it is probable that they served some religious purpose, and some of them were 'symbols of reverence erected by solar and phallic worshippers.'

They can no longer be attributed to the Phenicians. "Both in their plans and masonry, they are quite unlike anything that we know of that is Phenician." All the evidence indicates that their builders came for gold, and many specimens of that metal have been found in the ruins. A number of the sites are, however, in regions which are not auriferous. This Mr. Swan explains by the supposition that the attraction was the search for gems, which are found in moderate abundance. He does not attempt to identify the builders, but inclines to the belief that they will be shown to have come from southern Arabia.

ANTIQUITIES OF COSTA RICA.

THE National Museum of Costa Rica has commenced the publication of a series of articles descriptive of the antiquities of that republic. The first number (pp. 37) is by Señor Anastasio Alfaro, the competent director. It is illustrated and divided into three chapters, the first general, the second on the gold work of the Guetares Indians, the third on arms and ornaments in stone.